

Blended Learning Committee Report January 12, 2011

1. Background

Upon the request of Provost Farvardin, Dr. Joseph JaJa (Interim VP and CIO, Office of Information Technology) summarized the state of technology enhanced learning at UMCP to the Council of Deans on October 4, 2010. The presentation provided a high level overview of the main approaches to technology enhanced learning environments, current educational tools available on campus, and examples of blended learning courses. The discussions that followed showed a strong desire for the campus to pursue an aggressive strategy to promote and introduce blended learning or learning innovations through the use of technology. Provost Farvardin then asked Dr. Jennifer Preece (Dean, ISchool) to chair the Blended Learning Committee to develop a process for identifying three to four courses that would illustrate the effectiveness of a blended learning approach over traditional instructional delivery methods.

The members of the Blended Learning Committee together with their affiliations are listed in the table below.

Blended Learning Committee Membership 2010-2011		
Name	Title	College
Ahn, June	Assistant Professor	iSchool/COE
Bailey, Joe	Professor Decision, Operations & Information Technologies	BMGT
Barkley-Brown, Elsa	Associate Professor History	ARHU
Benson, Spencer	Director, Center for Teaching Excellence Associate Professor, Cell Bio & Molecular Genetics	CLFS
Chen, Alex	Associate Professor Urban Studies & Planning Program	ARCH
Cohen, Helene	Senior Lecturer , Education Leadership, Higher Education & International Education	EDUC
Higgins, Chris	Manager Learning Technologies	OIT
JaJa, Joseph	Interim VP and CIO, Office of Information Technologies Professor Electrical and Computer Engineering and UMIACS	OIT/ENG/ CMNS
Lo, Martin	Associate Professor Nutrition and Food Science	AGNR
Oliveira, Marcio	Assistant Professor Kinesiology	SPHL (Public Health)
Preece, Jennifer	Professor and Dean The I School	iSchool
Ruth, Matthias	Professor School of Public Policy	PUAF (Public Policy)
Schwab, Robert	Professor Economics	BSOS
Yaros, Ron	Assistant Professor School of Journalism	JOUR

2. Blended Learning Committee Report

The Blended Learning Committee was charged by Provost Farvardin to identify characteristics of blended learning courses and to develop an implementation plan for soliciting proposals from faculty to pilot learning innovations across a variety of courses. A blended (also referred to as a hybrid) course requires a combination of both, face-to-face and online interactions, and involves a rich, collaborative environment embedded with a learning space containing a variety of information sources such as, simulations, interaction mechanisms, and visualization. The recommendations summarized in this report are to be used to solicit and evaluate proposals from the University of Maryland Community. The proposals are expected to provide faculty with an opportunity to introduce innovative blended learning methodologies to their classrooms. The proposals are to enhance the students' learning opportunities in specific challenging courses. Proposals that are limited to creating online course content or that make use of technologies in a standard way will not be eligible for funding under this program.

The Provost's call to the University Community should be for *proposals that have the potential to innovate students' learning opportunities by offering a new vision for blended courses*. A small set of promising proposals will be selected for significant funding. Courses with a history of high enrollment and those identified, as unusually challenging to the students because they are conceptually difficult (e.g., statistics, mathematics, foreign language courses, creative pursuits) or unusually challenging to faculty (e.g., very large enrollment classes) will have higher priority for funding. Exceptional proposals for courses with smaller enrollment and those that require fieldwork may also be selected for funding. In this category, priority will be given to proposals that use blended strategies to promote new ways of using technology, such as simulations and visualizations of complex systems.

It is expected that this campus initiative will be the first step toward establishing a constantly growing core group of faculty, called *Blended Learning Fellows*, who will serve as a resource and a catalyst for technology-based educational innovations on campus. A close working relationship between the Blended Learning Fellows and OIT will help the campus in moving forward towards reclaiming its national leadership in educational technologies.

3. Examples of Current UMCP Blended Learning Courses

This section presents a brief description of some current courses that use e-learning strategies and blended components in our campus. More detailed descriptions of these courses appear in Appendix A.

KNES370 - Motor Development - Professor Marcio A. Oliveira – School of Public Health – Department of Kinesiology (180 students). Online and face-to-face pedagogies are used by trading-off 50 minutes of the contact time in the lecture hall with lectures streamlined through ELMS (powered by Blackboard). Students are asked to watch a weekly lecture online, complete an online quiz, and attend a discussion section with the TA before attending the 50-minute class period with the instructor (in the lecture hall). There is no content delivered via PowerPoint slides during the class period. Rather, answers are provided to all questions prompted by the online lectures, quizzes, and TA discussion. The class in the lecture hall is basically an open environment to be created with and by the students. The primary goal of the face-to-face lectures

has become the translation of basic knowledge taught in the online lecture to advance the students' personal and prospective professional life.

JOUR 289I - Information 3.0: Exploring Technological Tools - Professor Ronald Yaros – School of Journalism (36 students). Students from all majors learn technical fluency and develop information literacy as they use multiple media to seek, select and share information about emerging issues in the digital world. From week one, students research, collect and produce course-related information as they build their own ePortfolios. Students use these blogs to synthesize weekly course topics, such as privacy and security of information, with his or her field of study. Between classes, students also use social networks, instant messaging, virtual environments and mobile devices with a custom course app to produce tweets, photos, audio interviews and video reviewed and discussed in class. Several ELMS tools are also used for automated class attendance records and quizzes, grading, field group projects, virtual Wimba meetings, and other work not intended to be public. All activity is blended on the Information 3.0 [web site](#), which aggregates daily information “bits” and tweets from students and links to each of their topic-specific ePortfolios.

ECON 200 – Principles of Microeconomics – Professor Robert Schwab – Economics Department – College of Behavioral and Social Sciences (Approximately 400 students). ECON 200 was offered as a blended course for the first time in summer, 2010. Students watched a set of online, recorded lectures. Lectures were recorded in Camtasia; students heard the instructor's voice and saw a PowerPoint presentation. The class included online discussion sections (facilitated by graduate teaching assistants) through Wimba twice each week. Aplia, a web-based homework system developed by Cengage Learning, was used extensively in the course. ECON 200 is being offered this winter term in the same format and the plan is to offer at least two sections in the same format this summer.

LBSC642 - Integrating Technology into Learning and Teaching – Professor June Ahn - College of Information Studies (9-27 students). The students use Twitter extensively both in and out of class to blend the boundaries between the course and the outside world. Students create a Twitter account, follow their peers, and also the class Twitter page. Throughout the semester, students contribute thoughts and questions on the readings, and also share outside resources and timely links that relate to the class topics. The influence of using social media in this way has been numerous. Twitter has facilitated students and instructors getting to know each other more personally, created an “always on” stream of information and thoughts, and has been a way to bring student ideas and questions from the Twitter feed into the face-to-face class discussions. After the course, students have maintained their Twitter presence and connected to their broader professional communities (i.e. connecting with other Library Media Specialists), creating their own personal learning networks beyond the class.

EDHI670 – Professor Helene Cohen – Education Leadership, Higher Education & International Education – College of Education. (15-20 students) Building Learning Communities in Educational Organizations is a graduate level course in the College of Education. It is delivered in a blended format for three primary reasons: 1. To serve a geographically diverse population of students who work fulltime as school administrators; 2. To provide students experience with, and model, the 21st century technology tools they will be using in the PK-12 school buildings; and, 3. To deliver course content about building learning communities in a socially-networked, virtual environment. The specific technological tools that are blended into the course delivery system include a live, synchronous virtual classroom, digital storytelling, personal blogging, wikis for collaboration, photo albums, and case study interactions on a discussion board. Student feedback, gathered through anonymous midcourse surveys and

summative course assessments, attests to the deep impact the technological aspect of the course has on student understanding of the subject matter and ability to apply the course content to real-world situations. Perhaps most importantly, students gain the skills and confidence that empower them to utilize these new tech tools in their work within PK-12 school systems.

4. Characteristics of Blended Learning Courses

The courses described above illustrate the potential for blended approaches to expand and contribute to the students' learning effectiveness. They reflect innovative and creative use of new and ever changing technologies that extend the students' learning environments beyond the classroom and the physical campus. Although they differ across many factors such as, number of students, content, types of technologies used, resources, pedagogies, and assessment strategies, they all share at least two main characteristics:

- the instructor's willingness to experiment, to take risks, and to test new technologies to improve the students' learning experiences; and
- a commitment to improve learning by enhancing access to information, enabling students to test their knowledge, engaging students, and promoting collaboration, as well as fostering the students' application of knowledge from the course.

A Blended Learning course seeks to (1) Disseminate and Inform; (2) Educate; (3) Engage; and (4) Promote Appreciation through a creative use of technologies. A more detailed description of these objectives is provided below. A list of technologies supported by the campus are provided in Appendix B.

To Disseminate and Inform: Blended Learning should support access to information by using an appropriate selection of the range of instructional media. Instructional media can range from audio files, video, hyperlinks to Twitter, simulations, and visualization. The technology can provide synchronous and asynchronous access to information. It can act as an electronic clearinghouse, and it can provide real-time access to lectures (e.g., the use of WimbaLive or similar). In addition, blended learning strategies can act as a gateway to allow students to interact with a diverse range of people and content from the outside world.

To Educate: Blended learning strategies should be a medium through which students can relate and apply what they are learning. The use of on-line tutorials, exercises and activities (e.g., Aplia), can potentially be used to complement the student's classroom experience. Furthermore, they provide students with the flexibility to learn at their own pace and can provide interactive ways for students to learn with and from their peers. The use of e-learning strategies should allow students to self-assess their knowledge within the context of the course material *per se*, and not within the context of the exam format (e.g., limited to close-ended questions).

To Engage: Blended learning strategies should provide opportunities to be an active, and life-long learner. It should engage students as partners and collaborators throughout their course experience. The use of clickers provides one means to foster engagement inside the classroom. However, the use of social media (e.g., Facebook, Twitter, blogs) also offers opportunities to transform and expand the traditional nature of professor-to-student interactions by shifting from an information-giving learning model to an active-critical and collaborative model of learning.

To Appreciate: Blended learning strategies should stimulate student appreciation of the subject matter regardless of whether the course is a core requirement, elective, or part of the major requirement. A blended learning approach should help course material resonate with the students by using for example simulation and visualization tools. It should help sustain interest by the students who are developing skills throughout the course. In addition, appreciation will

potentially trigger the students' interest for lifelong learning; for example, a student might maintain a class project (e.g. a blog) after the class has ended to develop new interests.

The selection and use of blended learning strategies to (1) disseminate; (2) educate; (3) engage; and (4) promote appreciation will be mitigated by several course constraints. Clear identification and detailed analysis of these course constraints will also influence the blended learning course success. Examples of these mitigating factors (i.e., constraints) are:

- Scale: class size, classroom type;
- Content: type of material to be conveyed (e.g., theory or practice);
- Resources: Type of Hardware/Software available, Teaching Assistants, faculty technical expertise, available technical support;
- Pedagogies: lectures, discussions or laboratory sections, project;
- Type of course: mandatory/elective; majors/non-majors; lower /upper level, undergraduate/graduate, shared/cross-listed; and
- Audience: Student-learning strategies vary depending on their level of experience in higher education. For example, students in their sophomore and junior years often require more scaffolded approaches and development of basic and instrumental skills such as: time management, academic/professional writing, and familiarity with learning tools, as compared to courses designed for students in their senior years or at the graduate level.

The table below summarizes lessons learned by these courses and provides a potential rubric to assess blended learning strategies. It is presented only as a framework to illustrate the characteristics of blended learning, since each course will likely fit different cells.

Blending Learning: Mitigating Factors by Goals						
	Mitigating Factors					
Criteria	Scale	Content	Resources	Pedagogy	Course type	Audience
To Disseminate & inform						
To Educate						
To Engage						
To Appreciate						

5. Assessment

Assessment is considered an integral part of the learning enterprise. The innovative nature of these proposals highlights the need for a rigorous means to assess the effectiveness of integrating new technologies into the classroom.

Each proposal must include a description of an assessment plan that addresses the areas listed below. The assessments should ideally be both formative and summative and will include an OIT instructional designer who will work with the instructors to help them design and implement the assessment components.

- Student use and access to educational materials such as recorded lectures and other learning support tools such as web-materials, tutorial, databases, simulations, models and quizzes.
- Student ability to assess their own course related knowledge in formative and/or summative ways (e.g., reflections, quizzes, surveys, etc).

- Student engagement in the learning processes and their ownership of the course materials (including possible use of the SALG survey <http://www.salgsite.org/>).
- Student perceptions of the relative efficiency of the blended course format with respect to learning and engagement in comparison to traditional courses.

In addition to the assessments strategies presented within a course, professors whose proposals are selected will be expected to participate in institutional surveys, course data collection and focus groups that will be designed to assess utility, feasibility, and professors' and students' needs for future UM blended courses.

6. Blended Learning Fellows Proposal Process

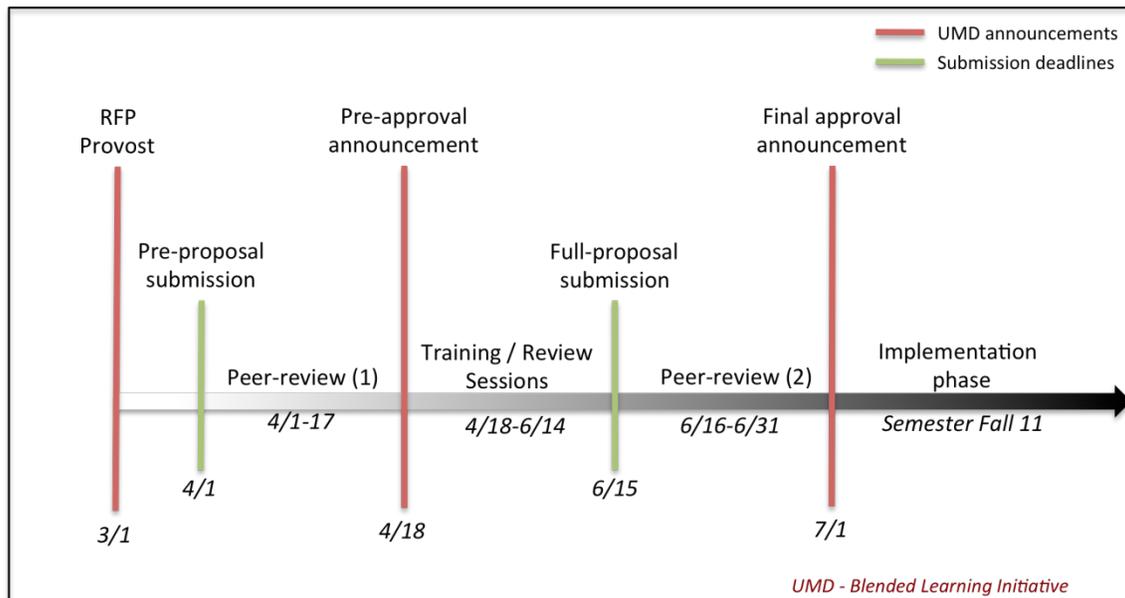
The committee recommends a two-phase process with suggested timelines based on the assumption that the RFP will be announced on March 1, 2011 (See timeline below).

- **Pre-proposal Phase.** Faculty will be invited to submit pre-proposals by April 1, 2011. Each pre-proposal should provide the following information: (i) brief course description and enrolment details for the past two years; (ii) needs and anticipated learning goals; (iii) possible blended learning approach, including innovative and relevant changes to the course describing how students will dramatically benefit from a blended approach; and (iv) an assessment strategy that clearly evaluates the desired outcomes. The pre-proposal should be no longer than *three* pages. During this period, OIT will provide face-to-face and online informational sessions about the use of technologies in blended courses. These sessions will include demonstration courses that have been offered by UMD faculty. Selection of pre-proposals will be completed by April 18, 2011. Authors of pre-proposals not selected to proceed to the next phase will be invited to participate in a boot camp on blended learning hosted by CTE and OIT. There will be financial incentives to help in creating a core faculty group with significant expertise in blended learning.
- **Proposal Phase.** Up to ten selected pre-proposals will be invited to submit full proposals that will be due by June 15, 2011. A full proposal should be no longer than *six* pages. It should include not only the information required for the pre-proposals (items i, ii, iii, iv described above), but also a detailed description of: (a) the blended learning approach; (b) e-learning tools to be used; (c) assessment plan, and anticipated outcomes; (d) how technology will be integrated to meet the course learning outcomes; (e) an implementation plan with a time line for development in Fall 2011 semester with clear benchmarks; (e) personnel information detailing each proposer's prior academic, pedagogical and technical (e-tools) experience; and (f) an itemized and justified budget. Letters of endorsement from the Department Chair and Dean are also required. The letters must provide evidence of how the department will support the implementation of the proposal if funded. In addition, it may include the department's commitment to support continued use of the blended learning strategies developed for the course. During this period, the participating faculty will be invited to attend blended learning workshops, in which faculty and staff will share their experiences about course redesign processes. OIT instructional designers will be assigned to work with the instructors to optimize the development and implementation of the funded proposal, which will include demonstrations of various e-learning tools and possible assessment metrics.

Successful proposals will be announced by July 1 2011. An OIT instructional designer will be assigned to each successful proposal who will work closely with the faculty leader on an implementation plan for Spring 2012. The OIT instructional designer will offer training and support for use of technology learning tools, and provide assistance in solving integration and

implementation issues. The selected fellows will be required to be members of a campus blended learning community that will begin with a full day retreat in August 2011, and will continue with regular meetings through Fall 2011 and Spring 2012 semesters. The purpose of the blended learning community is to share knowledge, provide peer feedback and aid the fellows through the processes of development and implementation of the funded proposals.

Proposal Submission Timeline



Selection Criteria

In order to conduct a fair, competitive, transparent, peer-review evaluation process, the following criteria will be used:

- **Innovation and Impact:** Are the proposed blended learning strategies to disseminate and inform, to educate, to engage and to promote appreciation, and the use of selected e-tools innovative, original, and creative? What are the potential improvements with the implementation of blended learning strategies? Will the proposed strategies make students' learning more effective, and create a better experience for the learner?
- **Goals and Outcomes:** What instructional or community building goals are being addressed through use of the proposed technology? What are the specific learning outcomes the proposal anticipates achieving? How will the blended version better achieve the course learning outcomes?
- **Plan and Feasibility:** What are the predicted challenges and how will these challenges be addressed? To this end, how have factors such as scale, content, resources, pedagogy, course type and audience influence course design. Is the proposed implementation plan feasible?
- **Transferability:** How will the proposed blended learning strategies serve as a model for other sections and courses? How can it be scaled up to impact other departments or colleges?
- **Assessment:** How will the effectiveness of the proposed blended course be assessed in both a formative and summative manner?
- **Budget:** Are the budget items, and the level of funding requested appropriate for the overall effort?
- **Personnel and evidence of skills in teaching:** Does the lead instructor have enough

academic, pedagogic and technical expertise to lead the implementation of the proposal?

Appendix A Detailed Descriptions of Example Courses

KNES370 - Motor Development

Instructor: Marcio A. Oliveira – Department of Kinesiology – School of Public Health

Topic : Understanding of the developmental processes that underlie the control of movement as well as the factors that influence change in and acquisition of motor skill across the lifespan.

Target Level -300 level – core of Kinesiology and Physical Education majors

students – 180 students

Main goals of course - This course examines the broad domain of human motor development with an emphasis on the foundations formed in early life. The primary thrust of this course is towards an understanding of the developmental processes that underlie the control of movement as well as the factors that influence change in the acquisition of motor skill across the lifespan.

Assessment (how will you know blended learning improved learning?)

Based on student's survey, we can attest that the new course dynamics have dramatically changed not only the students' engagement during the face-to-face lectures, but also their level of interest and commitment to their own learning process. The survey included 10 questions to assess: student's engagement, effectiveness, use of the e-tools and time management.

Technologies used and why

We blended online and face-to-face pedagogies by trading-off 50 minutes of the contact time in the lecture hall with lectures streamlined through ELMS (powered by Blackboard). Students are asked to watch a weekly lecture online, to complete an online quiz, and to attend a discussion section with the TA before attending the 50-minute class period with the instructor in the lecture hall. There is no content delivered via PowerPoint slides during the class period. Rather, we begin the class by answering all questions prompted by the online lectures, quizzes, and TA discussion. The class in the lecture hall is basically an open environment to be created with and by the students. The primary goal of the face-to-face lectures has become the translation of basic knowledge taught in the online lecture to advance the students' personal and prospective professional life.

Broader application of the technologies and innovation

The virtual lectures, quizzes and other e-learning tools used on this hybrid course can be broadly implemented in any other course. The uniqueness of this blended version is that: beyond adding the technology tools, we have also focused on shifting our pedagogical strategies -- foregoing the information-giving learning model to apply an active-critical and plural-formative paradigm. This not only allows our students to be informed, but to critically discriminate and fully utilize the overwhelming amount of information that is freely accessible to them.

JOUR 289I Information 3.0: Exploring Technological Tools. Taught by Assistant Professor Ronald Yaros, School of Journalism.

Information 3.0 – titled to represent *the future* of information - was one of the first twenty-five chosen in a campus-wide competition for "[I-series](#)" courses that "investigate significant issues and inspire in innovative ways." Since several interactive -often-experimental - teaching techniques are used, some of the techniques, tools and assignments may not be useful in other discipline –specific courses. Having said that, the class isn't just about learning online tools, video, audio, and podcasting. Students develop technical fluency as they research and critically assess broad issues ranging from digital information in developing countries to emerging technology that assists individuals with disabilities. The processes and application of these skills between class meetings and similar learning outcomes could be pursued to expand almost any course into a blended learning environment. 3.0 undergraduates from all majors use laptops *during*

class and university-supplied iPod Touch devices between classes to engage with the professor, each other and course content.

For blending in class and out of class interactivity, the 3.0 [public web site](#) aggregates daily “bits” of information from everyone in class and links to each student’s blog where digital culture is synthesized with their particular field of study. Several field assignments, in-class quizzes and weekly writing on their blogs replace traditional written exams. Students collect, critically assess and produce content-specific digital information as they build ePortfolios of research. We use social media, cloud computing, mobile information and virtual environments to evaluate their utility, efficiency, accuracy and issues of privacy. Two semesters of research to systematically collect data about the blended teaching suggest statistically significant differences in how much students like the course, engage with content, collaborate with peers and rate their level of learning, as compared to their other classes.

ECON 200 - Principles of Microeconomics

Instructor: Adriana Vamosiu, Department of Economics, College of Behavioral and Social Sciences.

Topic: ECON 200 is the microeconomics half of a two-semester introductory course on the principles of economics.

Number of Students: We offered an online version of ECON 200 for the first time during Summer Session I 2010. The class had 54 students. We offer roughly 3,000 seats in ECON 200 each year. An ECON 200 class in the fall and spring typically has 400 students.

Main Goals of the Course: ECON 200 introduces economic models of the behavior of individual consumers and business firms. It uses those models to analyze a number of important economic problems including international trade, the distribution of income, policies for eliminating poverty and discrimination, the problems of environmental pollution, and the impact of different market structures on economic activity.

Assessment: We conducted an online survey to help us evaluate the class. The students enjoyed the flexibility in their schedules that comes with online lectures and agreed that the length of each recording was appropriate. Most students found the online discussion sections useful; the sections gave students an opportunity to review the material and prepared them for both the homework and the exams. Some students objected to our requiring attendance in two online discussions each week. There were concerns about having to actually take an in-person final. Many students agreed that the work load was appropriate for a four credit course but nonetheless expected the course to be much easier since it was offered online. The overall performance of the students was comparable to the performance we see in the traditional format for ECON 200.

Technologies used: The class covered all of the material we normally include in our standard, face-to-face format for ECON 200. Students watched a set of online, recorded lectures. Each lecture was roughly 20-minutes long. We recorded the lectures in Camtasia; students heard the instructor’s voice and saw a PowerPoint presentation. We hired an undergraduate student who had gone through OIT training to help with post-production of the Camtasia presentations. We held online discussion sections through Wimba twice each week.

We used Aplia extensively in the course. Aplia is a web-based homework system developed by Cengage Learning. The system combines aspects of practice problems with graded problems to encourage students to improve results as they work. It is designed to encourage student effort by providing feedback and by implementing a "try and revise" approach to answering problems. The assignments randomize both quantitative and qualitative aspects of questions, allowing students to get the practice they need through multiple attempts of core problems. Each Aplia problem covers one core concept, but each subsequent attempt of that problem provides students with a question and answer that are different from previous attempts and different from the attempts of their classmates, reinforcing their efforts and helping them learn.

Broader application of the technologies and innovation: We were sufficiently pleased with our experience last summer that we are offering ECON 200 this winter term in the same format and plan to offer at least two sections in this format this summer. We will continue to consider the possibility of using this format in our 400-student sections in the fall and spring.

EDHI670: Building Learning Communities in Educational Organizations

This is a graduate level course in the College of Education serving 15-20 students a semester. It is delivered in a blended format for three primary reasons: 1. To serve a geographically diverse population of students who work fulltime as school administrators; 2. To provide students experience with, and model, the 21st century technology tools they will be using in the PK-12 school buildings; and, 3. To deliver course content about building learning communities in a socially-networked, virtual environment. The specific technological tools that are blended into the course delivery system include a live, synchronous virtual classroom, digital storytelling, personal blogging, wikis for collaboration, photo albums, and case study interactions on a discussion board. Student feedback, gathered through anonymous midcourse surveys and summative course assessments, attests to the deep impact the technological aspect of the course has on student understanding of the subject matter and ability to apply the course content to real-world situations. Perhaps most importantly, students gain the skills and confidence that empowers them to utilize these new tech tools in their work within PK-12 school systems.

LBSC 642: Integrating Technology into Learning and Teaching

School & Level: College of Information Studies, Master of Library Science (MLS)

Number of Students: 9 in Fall 2010 (typically up to 27 in the class)

Overview:

This class explores the integration of new technologies into the classroom environment, with an emphasis on the role of the school library media specialist in facilitating that process. The word integration is the organizing term for the semester. To integrate technology into the classroom, students are asked to (a) familiarize themselves with current media tools, (b) understand the constraints and limitations of the K-12 school environments they may work in, and (c) develop curriculum that tightly marries the affordances of a media tool with educational goals, and (d) understand ways to collaborate with subject area teachers in this endeavor. The course is a mixture of (1) class discussion of major issues surrounding technology, education, and integration, and (2) mini workshops of new media tools and their relevance to teaching and learning.

The students take turns throughout the semester presenting various technologies that they think are promising for the classroom. In addition, they create assignments for their peers to complete, using these technologies so that the entire class has hands-on experience with various tools. The technologies presented range from online video creation tools, desktop screen capture software, audio tools, and various social media platforms (i.e. Twitter, Edmodo etc).

In addition to the technology workshops, class discussion and readings are a major component of the class. The primary technology used in this class is Twitter, which creates a blended environment that facilitates critical thinking and discussion. Each student has a Twitter account. Every student follows their peers and the course Twitter account. Each week, students are tasked with “tweeting” questions about the week’s readings, responding to their peers’ questions or tweets, and sharing new links and resources. Students are encouraged to use a Twitter client on their home computers, laptops, or mobile phones, so they can receive the class tweets on a continual basis.

Using Twitter in this way has led to several developments in the course. (1) Students have taken their Twitter participation outside of the confines of the course. They have created their own Twitter presence, linking with other library professionals, and beginning to participate in what are called personal learning networks (PLNs). Beyond the class, they are increasingly participating in the professional communities, which they will join after graduation. (2) The 140 character tweets allow students to share quick thoughts, which then I (the instructor) bring to class to spark in depth discussion. Students have commented that they prefer reading these short thoughts that then spur face-to-face discussion, instead of long, tedious message board conversations typically seen in Blackboard. (3) The participation in class discussions has typically been engaging and productive, mainly due to the fact that students drive the discussion topics via their tweets prior to the face-to-face meeting. (4) While students drive many of the discussion topics, I as the instructor also participate in the Twitter conversation and interject with my own questions and topics. In this way, I ensure that the students talk about the key concepts I want to expose them to, but also engage and diverge into areas that interest them personally. Twitter opens up the participation possibilities, and allow for this balance of student-driven and instructor-driven dialogue.

Appendix B Available Tools

Available campus tools to support blended learning include:

Blog tools: Blogs are easy to use web-based applications that organize and display your text, image, or media entries as separate chronological entities and then automatically archive them according to month. "Bloggers" tend to use these tools to chronicle experiences, research, reflections, or opinions about a particular topic. Available tools on campus are: WordPress multi-user at blogs.umd.edu, and Learning Objects Journals and Blogs.

Clickers: In the classroom, an audience/learner response system allows all audience members to participate in presentations or lectures by submitting responses to questions using a response device ("clicker"), a mobile device, or the web. The polling can be integrated into PowerPoint or overlaid any software application.

Content recording tools: There are a number of tools available to capture content to distribute to students. Audacity is a free tool to capture audio that can be used for podcasts. Camtasia is software that captures your desktop and can be narrated for support, or used for presentation of content of any length. Jing is a free tool that allows for easy capture of screenshots and short videos of a computer desktop for demonstration and instruction.

ELMS (powered by Blackboard) is a secure learning management environment that includes a wide variety of tools for displaying materials, communication, grading, file sharing, and others. Grace: For both classes and research projects, Grace provides access to storage for file sharing. The system provides an infrastructure for general file sharing among students, a personal student space for class files and interaction with the teacher, a homework drop box, and a place for faculty to distribute files for the class.

iTunesU: iTunesU is a special subset of the Apple iTunes store that enables academic institutions to make audio and video content available for subscription and download.

Panopto: Class capture gives faculty the opportunity to record their classes on a daily basis or for special sessions. Panopto lets faculty capture their PowerPoint, computer desktop, document camera, and other sources including video and audio of the classroom to distribute to their students as a resource after class.

Podcasting Tools: A "podcast" is a method of publishing digital files to the Internet for playback on mobile devices and personal computers. Podcasts are often distributed around the Web via "RSS feeds" to which users can subscribe. Available tools on campus are: iTunesU, Wimba Podcaster, and podcast.umd.edu.

Streaming: Similar to podcasting, streaming technology enables you to watch or listen to video or audio while the content is transmitting (streaming) from a server to your computer. Available tools on campus are: Wimba Classroom archives, Panopto classroom capture recordings, and streaming.umd.edu.

OTAL Sandbox server: OTAL was set up to support classes that are creating group or class web pages; and, to support those who need web space for class or research needs that require cgi, perl, php, or other programming needs. It has been used in recent years by courses to try out new Web 2.0 technologies, or even to build their own. Wikis, blogs, web surveys, online museum tools, and more have all been used on OTAL.

Collaboration Tools: Wimba Classroom is a real-time virtual classroom environment designed for distance education, blended learning and collaboration. Sessions can be recorded for later viewing and interaction. Wimba Pronto is an instant messaging tool linked to the enrollments in ELMS courses. It gives students and faculty the ability to collaborate communicate and collaborate outside a regularly scheduled time.

Wimba Voice Tools: Wimba Voice Tools makes it possible to record and post audio to your ELMS (powered by Blackboard) site. Wimba Voice incorporates the use of threaded voice boards, voice-enabled email, embedded voice within course pages, as well as live group discussions and debates, which increase the interaction and student engagement level of any online course.

WIKI Tools: A wiki is a page or collection of Web pages designed to enable anyone who accesses it to contribute or modify content. At its simplest, it can be read just like any other web site, with no access privileges necessary, but its real power lies in the fact that groups can collaboratively work on the content of the site using nothing but a standard web browser.

Available tools on campus are: Mediawiki, and Learning Objects Wikis

Social Networking Tools: This term is defined in different ways and some definitions include some of the software types mentioned above including blogs, micro-blogs (e.g., Twitter), Wikis and almost kind of software that promotes social interaction. We also include Facebook and other platforms specifically designed to promote social interaction.